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ABSTRACT

This report describes the Comprehensive Instructional Management System (CIMS), which includes a teacher-developed mathematics curriculum for kindergarten through grade seven, corresponding criterion-referenced tests, and a computerized test scoring and reporting management system. The evaluation focused on the five pilot districts in New York City that have implemented the project since 1983-84, including use in special education classes. The evaluation was based on in-depth interviews, questionnaires, test analyses, and student achievement data. Among the major findings were: (1) CIMS was associated with overall growth in mathematics achievement; (2) CIMS was generally successful in promoting district self-sufficiency in managing project objectives; (3) teachers made more extensive use of CIMS curriculum materials than in previous years; (4) more teachers used the CIMS tests and manuals, although special education teachers made less use of them. Recommendations were made to continue staff development and support, including increased use of computers. Tables are included, as well as appended cohort analyses for the five pilot districts. (MNS)

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March, 1987

COMPREHENSIVE INSTRUCTIONAL MANAGEMENT SYSTEM (CIMS)- MATHEMATICS PROJECT 1985-1986 END OF YEAR REPORT

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EVALUATION SUMMARY

The Comprehensive Instructional Management System (CIMS)-Mathematics Project includes a teacher-developed mathematics curriculum for kindergarten through grade seven, corresponding criterion-referenced tests, and a computerized test scoring and reporting management system. It was used in varying ways in 24 New York City community school districts (C.S.D.s) in 1985-86. The evaluation for the year focused on the five pilot districts (C.S.D.s 1, 12, 18, 23, and 32) that have implemented the project since 1983-84. This included the use of CIMS-Math in special education classes in C.S.D.s 1 and 18, where under Project SEALL (Special Education at the Local Level) special education was under the direct supervision of the districts. The evaluation also examined the implementation of CIMS in three of the five additional districts (C.S.D.s 8, 15, and 30) using CIMS curriculum manuals in all grades in all schools in 1985-86.

The goals of the CIMS-Mathematics Project for 1985-86 were: 1) to promote self-sufficiency on the part of the five original districts in managing the curriculum, computerized testing systems, and staff development programs; 2) to introduce and support the adoption and implementation of CIMS in districts new to the project; 3) to continue revising CIMS curriculum manuals and tests; and 4) to promote steady growth in student mathematics achievement.

The evaluation of the project was based on a number of data sources: in depth interviews with the mathematics unit director as well as with project, district, and school staff; questionnaires distributed to a random sample of general education teachers in the five pilot and three non-pilot districts, and special education teachers in the SEALL districts, C.S.D.s 1 and 18; psychometric analyses of CIMS tests; and student mathematics achievement data for spring, 1983, 1984, 1985, and 1986.

The evaluation yielded a number of findings on the use, assessment, and effectiveness of the CIMS-Mathematics Project. Among the major findings were the following:

- In the pilot districts, CIMS was associated with overall growth in mathematics achievement from 1983 to 1986. Cohort analyses showed that fifth-graders in 1986 gained 4.7 N.C.E.s over the three years, and sixth-graders gained 8.0 N.C.E.s. Seventh-graders, however, declined 2.4 N.C.E.s. In the non-pilot districts, students significantly outperformed their peers in non-CIMS districts with both structured and unstructured mathematics programs in 23 out of 30 within-grade comparisons.

- In the pilot districts, the project was generally successful in promoting district self-sufficiency in managing project activities. Apart from some initial staff development assistance and ongoing computer system support from CIMS project staff, the districts were largely responsible for the operation of the project during the year.

- Survey data revealed that teachers made more extensive use of the CIMS curriculum materials than in previous years. A majority of teachers (57 percent) rated the manuals' presentation of math concepts and skills satisfactory or better. Teachers continued to express dissatisfaction with the sequencing of objectives and pacing of the curriculum. Of 67 new teachers in the pilot districts, a majority (55 percent) found their introduction to CIMS inadequate.

- The percentage of teachers using the CIMS tests rose to over 80 percent from 67 percent the previous year. Fifty-three percent of respondents found the computerized test reports very or moderately useful for instructional purposes. Nearly all principals interviewed believed that the computer management component of CIMS was useful for supervision and administration, but were less likely to specify ways they used it.

- On the average, commitment to the CIMS manual in the pilot districts increased from 2.3 to 2.6 on a four-point scale (in which 1 represented "not committed" and 4 "very committed"), especially in C.S.D.s 23 and 12.

- Special education teachers in the SEALL districts made less use of the CIMS manuals and tests than did general education teachers. Special education teachers in C.S.D. 18 attended more staff development activities and were more committed to CIMS than their general education colleagues; those in C.S.D. 1 attended fewer and were less committed.

- The extent to which the curriculum manual was used in class varied widely among the non-pilot districts. On the whole, three-quarters of the teachers used the manual as the primary text or as the equal of another. Teachers' assessment of the manual was high: 75 percent found its presentation of mathematics concepts and skills satisfactory or better. Teachers' self-reported commitment to CIMS also varied across the three districts; on the average, 63 percent of teachers were very or moderately committed to its continued use.

On the basis of these findings, a number of recommendations were made, among them the following:

- The pilot districts should continue staff development and support for teachers, focusing especially on the cyclical approach to instruction and use of the management reports. Greater attention should be paid to introducing CIMS to new teachers.

- Given the complexities of implementing centralized computer systems in the districts, CIMS project staff should continue to explore the use of school-based microcomputers for CIMS.

- Districts implementing the computerized testing system should conduct more staff development activities for administrators and supervisors on instructional planning and the use of test results.

- The ongoing curriculum revision process should address teachers' continuing reservations about the sequencing of objectives in the manuals.

ACKNOWLEDGMENTS

The production of this report is the result of a collaborative effort on the part of full-time staff and consultants. In addition to those whose names appear on the title page, the Unit is grateful to the following individuals for their able assistance: Maria Cheung, Alan Pershing, Theodora Ziongas, and Chris Langlois.

TABLE OF CONTENTS

		PAGE
I.	INTRODUCTION	1
	Program Background	1
	Goals for 1985-86	2
	Population Served	3
	Program Evaluation	3
	Scope of the Report	4
II.	PROJECT COMPONENTS	5
	Staffing and Administration	5
	Curriculum	6
	Tests	7
	Computer Management System	8
	Staff Development	9
III.	EVALUATION METHODOLOGY	10
	Data Sources	11
	Description of Respondents	12
IV.	FINDINGS	16
	Pilot District Implementation	16
	Curriculum	16
	Staff Development	25
	Testing	32
	Implementation of the Computer Management Systems	35
	Use of the Computer Management Reports	39
	Commitment to CIMS	43
	Non-Pilot District Implementation	45
	Staff Development	45
	Curriculum	51
	Commitment to CIMS	56
	Student Achievement	59
	Longitudinal Trends	60
	CIMS Versus Non-CIMS Mathematics Programs	63
V.	CONCLUSIONS AND RECOMMENDATIONS	65
	Pilot Districts	65
	Non-Pilot Districts	68
	Recommendations	69

APPENDIX: Cohort Analyses for 1983-86

LIST OF TABLES

		PAGE
TABLE 1:	General Education Teachers in the Pilot Districts with CIMS-Mathematics Curriculum Materials.	17
TABLE 2:	Use of CIMS-Mathematics Curriculum Manual by General Education Teachers in the Pilot Districts.	20
TABLE 3:	Ratings of the CIMS-Mathematics Curriculum Manual by General Education Teachers in the Pilot Districts.	22
TABLE 4:	General Education Teachers in the Pilot Districts Reporting Assistance with CIMS-Mathematics from Project, District, and School Staff.	27
TABLE 5:	General Education Teachers in the Pilot Districts Reporting Attendance at Staff Development Activities.	28
TABLE 6:	Ratings of the Usefulness of the Class Matrix for Instructional Purposes by General Education Teachers in the Pilot Districts.	40
TABLE 7:	Use of the Class Matrix for Instructional Purposes by General Education Teachers in the Pilot Districts.	42
TABLE 8:	Mean Ratings of Pilot District Teachers' Commitment to CIMS-Mathematics by District, 1984-85 and 1985-86.	44
TABLE 9:	Non-Pilot District Teachers Reporting Assistance with CIMS-Mathematics from Project, District, and School Staff.	48
TABLE 10:	Non-Pilot District Teachers Reporting Attendance at Staff Development Activities.	49
TABLE 11:	Use of the CIMS-Mathematics Curriculum Manual by Non-Pilot District Teachers.	53
TABLE 12:	Ratings of the CIMS-Mathematics Curriculum Manual by Non-Pilot District Teachers.	55

LIST OF TABLES, Cont.

		PAGE
TABLE 13:	Commitment to the CIMS-Mathematics Project Reported by Non-Pilot District Teachers.	57
TABLE 14:	Pilot Districts Cohort Analyses for 1983-86 by District and Group.	62
TABLE 15:	Analyses of Covariance on Spring, 1986 Total Mathematics Scores for CIMS-Mathematics Non-Pilot Districts and Non-Cims Mathematics Students by District and Grade.	64

I. INTRODUCTION

PROGRAM BACKGROUND

The Comprehensive Instructional Management System (CIMS)-Mathematics Project is a teacher-developed mathematics curriculum for kindergarten through grade seven, corresponding criterion-referenced tests, and a computerized test scoring and reporting management system. It began as a curriculum project in upstate New York in 1970 with a grant from the New York State Education Department. The CIMS curriculum model was introduced in New York City in Community School District (C.S.D.) 18 as the Instructional Support System (I.S.S.) in 1974 and in C.S.D.s 16 and 23 as the Instructional Management Project (IMP) in 1979.

In 1982-83, the New York City Board of Education's Division of Curriculum and Instruction received funds from the New York State Education Department to develop CIMS mathematics curricula for kindergarten through grade seven and a corresponding computerized test management system in four pilot districts, C.S.D.s 12, 18, 23, and 32. The Division of Special Education (D.S.E.) joined this effort in order to develop one mathematics curriculum that would be appropriate for both general and special education students. In 1983-84, the curriculum and computer management systems were implemented in the four original districts and C.S.D. 1.* The goal for this and following years was to consolidate use of the project in these five districts, with the districts taking increasing responsibility for the ongoing

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*The computer management system was never implemented in C.S.D. 12 because of lack of district support.

operation of the project, computer management system, and related staff development activities.

With the adoption of the CIMS sequence of objectives as the official Mathematics Scope and Sequence of the New York City public schools, the project continued to expand beyond the five original districts. In 1984-85, the CIMS curriculum manuals were used without the computer management component in selected schools and grades in seven additional school districts. In 1985-86, the manuals were used in all grades and schools in five school districts (C.S.D.s 5, 8, 15, 27, and 30) and in selected grades and schools in 14 other school districts. Of these non-pilot districts, only C.S.D.s 6 and 15 planned to implement the computerized test management component of the project and began piloting centralized computer systems in 1984-85. In addition, during this time, D.S.E. continued to implement the curriculum without project assistance in regional special education programs.

GOALS FOR 1985-86

Given the varieties of use of the CIMS curriculum manual and other project components, the CIMS-Mathematics Project had the following major goals for 1985-86: 1) to promote self-sufficiency on the part of the five original pilot districts in managing the curriculum, computerized testing systems, and staff development programs; 2) to introduce and support the adoption and implementation of CIMS in districts new to the project;

3) to continue revising CIMS curriculum manuals and tests; and 4) to promote steady growth in student mathematics achievement.

POPULATION SERVED

During 1984-85, the CIMS-Mathematics Project operated in all schools from kindergarten through grade seven in ten districts: C.S.D.s 1, 5, 8, 12, 15, 18, 23, 27, 30, and 32. In addition, the CIMS curriculum was used in selected schools and grades in 14 other schools districts. The project served both general and special education students.

PROGRAM EVALUATION

The 1985-86 evaluation of the CIMS-Mathematics Project by the Office of Educational Assessment/Instructional Support Evaluation Unit (O.E.A./I.S.E.U.) focused on project activities in both the original pilot and new non-pilot districts. The extent of implementation of project components, the assessment of the project by key participants, and CIMS' impact on student achievement in mathematics were the major areas assessed by the evaluation. Because of CIMS' emphasis on district ownership of the project, O.E.A.'s evaluation of the project's implementation in special education concentrated on those districts where special education is the responsibility of the districts rather than D.S.E., that is, the so-called SEALL districts (Special Education at the Local Level), 1 and 18.

SCOPE OF THE REPORT

This report presents the results of the evaluation of the 1985-86 CIMS-Mathematics Project. Background information and goals for 1985-86 are reviewed in Chapter I. Major project components are described in Chapter II. The evaluation focus and methodology are presented in Chapter III. Chapter IV reports the findings regarding the nature and extent of project implementation and participants' reactions, as well as student achievement data. Conclusions and recommendations are presented in Chapter V.

II. PROJECT COMPONENTS

STAFFING AND ADMINISTRATION

Under the leadership of the project director, the director of the mathematics unit and two CIMS assistant directors assumed overall responsibility for administering the project. Their responsibilities included: introducing the project to districts and schools new to CIMS; assisting mathematics coordinators in developing and implementing staff development activities in the districts; overseeing curriculum and test revision; documenting project activities; and providing support as requested by the five pilot districts. Three CIMS staff developers, called curriculum leaders, conducted district-wide and on-site school training for principals, supervisors, school-based CIMS liaisons, and teachers in the five pilot districts and those new to CIMS.

District mathematics coordinators functioned as primary CIMS liaisons in the districts, playing a central role in staff development in their districts, coordinating the ordering and distribution of materials by the districts and schools, and participating in the curriculum revision process by providing feedback from teachers to the central CIMS staff and in some cases writing or reviewing the curricula. In the SEALL districts (1 and 18), a special education supervisor was primarily responsible for the implementation of CIMS in special education.

The central CIMS computer manager and Office of Data Processing Coordination (O.D.P.C.) staff were responsible for overseeing the implementation and operation of the computer

management systems in the district by training district computer personnel, updating CIMS software and documentation, and providing ongoing service support to district computer systems. District computer managers were responsible for the day-to-day operation of the computer management system in each district, which included updating student rosters; overseeing test delivery, scoring, and reporting; interpreting test reports; and maintaining hardware and software.

CURRICULUM

The CIMS-Mathematics curriculum was developed by experienced New York City teachers for their peers. One of its characteristic features is the cyclical organization of material, unlike the topical organization of other approaches. This means that topics are not covered exhaustively at one time, but are introduced, then dropped, and reintroduced at a later date, thus promoting the integration of mathematics concepts and skills. Suggested getting started activities and teaching strategies are presented in the teacher manuals, and student workbooks provide opportunities for skill practice. It is intended that teachers follow the sequence of objectives, but supplement lessons with additional material and practice items from other instructional resources. The use of manipulative materials for lessons is considered an important part of the CIMS approach. Teachers are also expected to "spiral" homework assignments -- that is, to reintroduce topics in the same cyclical way as in classwork.

Curriculum Revision

Beginning with the kindergarten curriculum, the CIMS project has revised the teacher manuals, student workbooks, and tests for one or two grades each year. In 1985-86, a revised version of the second-grade curriculum was delivered to the districts, and revisions of grades three and four are expected to be ready for 1986-87. Changes in the revised curricula are reportedly extensive, including modifications in the instructional sequence, changes in objectives, and introduction of new modules. Recent changes have included extensive revisions in the introductory "Getting Started" activities, providing greater detail and illustrations. Included in the 1985-86 revisions of the student worksheets is a "Do You Remember?" component.

TESTS

An integral component of CIMS are the criterion-referenced cumulative end-of-modules tests, each covering several instructional modules and consisting of 25 to 45 multiple-choice items. The CIMS test reports generated by the computer management system, however, are intended to provide not only data on student progress, but information important to instructional planning. For this reason, the assistant directors do not promote the use of the tests without the management system, and the CIMS tests are only available to those schools that have a district- or school-based computer management system.

COMPUTER MANAGEMENT SYSTEM

Linked to the CIMS testing component in the original CIMS model is a district-based computer management system. Its major function is to provide teachers with prompt test results and a computerized item analysis to facilitate instructional planning, and to give supervisors information for monitoring mathematics instruction and for making long-range educational decisions. The system generates a number of test management reports: class matrix report (results from one test, analyzed by item, objective, and student); objectives by class inquiry (results of all tests given in a school by class and test); tests ordered/scored inquiry (the number of tests ordered and scored in a school by class); longitudinal report (objectives not mastered for all tests taken by each student); and parent report (results on a given test for an individual student). The class matrix report and parent reports are sent to teachers, and the reports of objectives mastered by class and tests ordered/scored are provided to principals.

Of the five new districts using CIMS in all schools and all grades, only two planned to pilot centralized computer systems, and on a limited basis: three schools in C.S.D. 6 and four schools in C.S.D. 15. The large commitment of resources and personnel necessary for centralized systems have led some districts to consider implementing instead a network of microcomputers located in individual schools. C.S.D. 18, one of the original CIMS districts, is working toward this goal, and two new

districts, C.S.D.s 30 and 15, plan to expand the use of in-school computers to score tests, as well as aggregating data for the district at a central point. CIMS assistant directors believe that the project is approaching a decision point in regard to the computer management component, and the more efficient in-school computers that provide nearly immediate feedback to teachers may turn out to be the more realistic choice for the future of CIMS-Mathematics.

STAFF DEVELOPMENT

Staff development is directed primarily at helping each participating district formulate and implement a plan for supporting teachers and supervisors in the use of the CIMS curriculum manual and testing system. CIMS central staff meet initially with the district superintendent and math coordinator to identify a staff development program that meets the district's needs and is compatible with district organization. Introductory training ordinarily includes presentations to principals, supervisors, and teachers. CIMS requires that a supervisor be present at all staff development activities conducted by project staff. District personnel are expected to provide ongoing follow-up staff training with assistance from CIMS.

III. EVALUATION METHODOLOGY

O.E.A. designed the 1985-86 evaluation of the CIMS-Mathematics project to answer the following major questions about the implementation and impact of the program:

- To what extent was the CIMS project implemented in the pilot and non-pilot districts? Specifically, to what extent were the curriculum, tests, and computer management system utilized where applicable?
- How important was the computer management system component for CIMS? To what extent did superintendents, teachers, principals, and supervisors make use of the computer management reports? What was their assessment of them?
- What was the nature and extent of CIMS staff development in the districts? What models of staff development appear to promote most effectively implementation of the project as intended and student achievement in mathematics?
- To what extent have the pilot districts become self-sufficient in regard to the ongoing operation of CIMS? What continued assistance, if any, do they need?
- What impact has CIMS had on student achievement in mathematics? How does student mathematics achievement in the CIMS districts compare with that of comparable students in non-CIMS districts?

The O.E.A. evaluation examined the ongoing operation of the project in the five pilot districts. The assessment of the project's implementation in the expanding number of new districts that have adopted CIMS focused only on those districts that have chosen to implement CIMS in all grades in all schools. Of the five new districts that implemented CIMS districtwide in 1985-86, O.E.A. examined the operation of the project in three, C.S.D.s 8, 15, and 30, selected at random.

DATA SOURCES

Evaluation of the CIMS-Mathematics Project in 1985-86 was based on a variety of data sources.

- In-depth interviews were conducted with a sample of general and special education teachers from all grades in the five pilot districts. (Special education teachers were interviewed and surveyed only in the SEALL districts, C.S.D.s 1 and 18.) The interviews dealt with teachers' use and assessment of the CIMS curriculum manual, tests, and management reports and participation in staff development activities. Information gathered in these interviews was used to design questionnaires to be sent to a larger sample of teachers in the pilot and non-pilot districts.

- Questionnaires were distributed to a random sample of general and special education teachers in the five pilot districts and three of the non-pilot districts, stratified by district and level (elementary and intermediate/junior high). They focused on teachers' use of the manual, testing system, and management reports, participation in staff development, and assessment of and commitment to the project.

- Phone interviews were conducted at the end of the year with a sample of principals from elementary and intermediate/junior high schools in the pilot and non-pilot districts. These dealt with the implementation of CIMS in the schools, the extent of local support for the project, and principals' assessment of the curriculum.

- In-depth interviews were conducted at the end of the school year with the director of the mathematics unit, as well as with project and district staff. They dealt with participants' roles and responsibilities, the operation of project activities, the nature and extent of staff development, the degree to which project goals were achieved, and future plans.

- Psychometric analyses of CIMS placement and end-of-module(s) tests were reviewed for their correlation with curriculum objectives, degree of difficulty, adherence to basic principles of test construction, and quality of design and production.

- Mathematics achievement data for a cohort of general education students in the five pilot districts were

analyzed. Normal curve equivalent scores (N.C.E.s)* on the New York City Mathematics Tests in spring 1983, 1984, 1985, and 1986 were analyzed. Changes in student mean mathematics achievement level from year to year served as a measure of project impact. In addition, the spring, 1986 mathematics scores of students in three non-pilot districts were compared with those in comparable non-CIMS districts to assess the impact of CIMS on mathematics achievement in districts new to CIMS.

DESCRIPTION OF RESPONDENTS

The interview and questionnaire data consist of responses from participants at all levels of program operation: central offices, districts, and schools. At the central level, interviewees included: the mathematics unit director, the two CIMS co-directors, the three CIMS curriculum leaders, and the CIMS computer manager. At the district level, the math coordinators and computer managers of the five pilot districts were interviewed, as well as the math coordinators of the three selected non-pilot districts. In addition, the special education coordinators for the two SEALL districts, 1 and 18, were interviewed by telephone.

In-depth interviews were conducted with teachers in one elementary school and one intermediate or junior high school in each of the five pilot districts. A total of 45 teachers were interviewed: 39 general education teachers and six special

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*Normal curve equivalent scores are similar to percentile ranks, but unlike percentile ranks, are based on an equal-interval scale which ranges from 1 to 99 with a mean score of 50 and a standard deviation of approximately 21. Because N.C.E. scores are equally spaced apart, statistical calculations such as averages are meaningful. In addition, comparisons of N.C.E. scores may be made across different achievement tests.

education teachers and six special education teachers in C.S.D.s 1 and 18. The six special education teachers included teachers of both the MIS-1 and MIS-2 functional categories.*

Phone interviews were conducted with a sample of five principals from each of the pilot districts and four principals from each of the non-pilot districts. Principals of elementary and intermediate/junior high schools were selected at random to match the ratio of elementary to intermediate/junior high schools. A total of 21 elementary school principals and 16 intermediate/junior high school principals were interviewed.

Questionnaires were sent to a random sample of 2,197 teachers in the five pilot and three non-pilot districts, stratified by district and school level. The sample, drawn according to standard sampling procedures, included 53 percent of the general education teachers responsible for teaching math in the eight districts. In addition, questionnaires were sent to 150 or 85 percent of the special education teachers in C.S.D.s 1 and 18. A total of 1,101 general education and 150 special education teachers in the pilot districts and 946 general education teachers in the non-pilot districts received questionnaires. Of these, 698 teachers returned completed forms. In the five pilot districts, respondents included 344 general education and 36 special education teachers, representing a response rate of about 31 percent for general education teachers and 20 percent

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*MIS-1 and MIS-2 are functional groupings of special education students based on the extent of intervention needed rather than the type of handicapping condition.

for special education teachers. Response rates for both groups combined varied somewhat by district: C.S.D.s 1 (40 percent) and 23 (37 percent) had the highest rates of return; C.S.D.s 18 (25 percent) and 12 (22 percent) the lowest.

About half of the teacher respondents in the pilot districts had used CIMS for three years, 30 percent for two years, and 20 percent were using it for the first time in 1985-86. They were primarily teachers of grades one through six, although a smaller proportion taught kindergarten or grade seven. Of the 36 special education respondents, 22 were from C.S.D. 1 and 14 were from C.S.D. 18. Twenty of the special education teachers identified the functional grouping of their classes as MIS-1, 12 were teachers of MIS-2 classes, and three were teachers of other special education students.

The 318 respondents from the three non-pilot districts represented a return rate of about 34 percent. A greater percentage of teachers from C.S.D. 8 (41 percent) returned completed forms than from C.S.D.s 15 (30 percent) and 30 (29 percent). The respondents from the non-pilot districts were teachers of kindergarten through grade seven, with the greatest numbers of them teaching kindergarten through grade four.

Respondents in both the pilot and non-pilot districts were highly experienced: over 60 percent of teachers in all districts had been teaching ten years or more. Only 12 percent were in their first or second year of teaching. All teachers assigned high ratings to their proficiency in mathematics: 90 percent

said their background in mathematics was very strong (30 percent) or somewhat strong (60 percent).

IV. FINDINGS

This chapter reports the results of the 1985-86 CIMS-Mathematics evaluation. Findings on project implementation in the pilot and non-pilot districts are reported first, followed by findings on student mathematics achievement.

PILOT DISTRICT IMPLEMENTATION

Curriculum

The major areas investigated were the availability of CIMS and other curriculum materials, teachers' use of CIMS in the classroom, and their assessment of it for teaching mathematics.

Availability of Materials. Table 1 presents the findings from the teacher survey on the availability of CIMS teacher manuals, student workbooks, and revised second-grade curriculum. Nearly all respondents received Part I of the manual; 19 teachers, however, were missing Part II. The majority of these were in C.S.D. 23, where there was no district math coordinator for a large part of the school year.

Three-quarters of the 64 second-grade teachers received the newly revised edition of the second-grade curriculum. Of 33 teachers who had used both the old and new versions, 60 percent believed that the revised version was an improvement. In the interviews, second-grade teachers reported mixed reactions to the new version. Several reported that the instructions were better

TABLE 1

General Education Teachers in the Pilot Districts with CIMS-Mathematics Curriculum Materials

CIMS Material	District 1 (N=91)	12 (N=49)	18 (N=66)	23 (N=63)	32 (N=67)	All Districts (N=336)
Teacher Manual						
Part I (N=323)	98%	91%	98%	100%	100%	98%
Part II (N=294)	95	93	91	81	100	93
Student Workbooks						
Part I (N=336)	86	29	29	83	91	67
Part II (N=304)	81	33	24	74	95	64
Revised Grade 2 Manual (N=64)	83	25	50	100	100	75

- Nearly all teachers received Part I of the manuals; slightly fewer received Part II.
- Availability of student workbooks varied by district; a majority of classes in C.S.D.s 1, 23, and 32 had them, whereas fewer than a third of the classes in C.S.D.s 12 and 18 did so.
- Three-quarters of all second-grade teachers received the revised version of the manual.

and the sequence was changed, while others noted that some pictures and instructions were confusing for students.

The findings on the availability of student workbooks largely reflected the policy on their purchase adopted by the districts. Use of student workbooks was highest in C.S.D.s 32 and 1, where schools were required by the district to purchase them. Although the math coordinator in C.S.D. 12 also reported that schools were expected to buy workbooks, only about 30 percent of the teachers reported having them. A similar finding was more predictable in C.S.D. 18, where purchase was optional and where the math coordinator did not recommend their purchase if facilities were available for copying individual worksheets from the teacher's manual. Two-thirds of the 144 teachers in all districts whose students did not have CIMS workbooks reported copying pages for their students.

The importance of student workbooks was underlined in the teacher interviews. One-third of the 15 teachers whose students did not have CIMS workbooks reported problems with copying worksheets, and nearly that many said that the lack of workbooks affected their commitment to the program. Teachers also spoke of the need for children to have a permanent document to give them a sense of continuity in their work, which was missing with the worksheets because they were easily lost. On the other hand, principals of schools that did not purchase workbooks cited two reasons: their expense and lack of sufficient practice items for students.

Other findings from the teacher surveys confirmed teachers' perception of the importance of the workbooks. Teachers with CIMS student workbooks reported themselves significantly* more committed to the curriculum manuals ($p < .01$), tests ($p < .05$), and computer management system ($p < .05$) than those without them. They also made significantly greater use of the manuals (as the primary curriculum or equally with another, rather than as a supplement to another curriculum) ($p < .001$), and tended to make greater use of the teaching strategies in the manuals than teachers without student workbooks.

Approximately two-thirds of the teacher respondents had additional mathematics textbooks in the classroom. Almost half reported having other student workbooks, most extensively in C.S.D.s 12 and 18. Although 53 percent of the teachers reported having manipulative materials, availability of these varied somewhat among the districts, and was appreciably lower in C.S.D. 23 than the other districts (28 percent).

Curriculum Use. The teacher surveys sought to determine the extent to which the CIMS curriculum manuals were used by teachers. Table 2 presents the findings on curriculum use by district. Two-thirds of the teachers reported using the manual either as the primary curriculum (as intended) or equally with other curricula, supplementing it with other instructional materials as intended.

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*Chi-square coefficients were computed to examine the significance of these relationships.

TABLE 2

Use of CIMS-Mathematics Curriculum Manual[a] by General Education Teachers in the Pilot Districts

Curriculum Manual Use	District 1 (N=91)	12 (N=46)	18 (N=65)	23 (N=64)	32 (N=68)	All Districts (N=334)
Only CIMS	9%	4%	2%	14%	19%	10%
CIMS as primary curriculum manual	45	44	35	38	56	44
CIMS & other curricula equally	28	24	35	17	21	25
CIMS as supplement to other curricula	18	28	28	31	4	21

[a]The CIMS-Mathematics curriculum is intended to be used as the primary curriculum, supplemented by other resource materials.

- Overall, nearly 70 percent of teachers used CIMS as the primary curriculum or equally with other curricula.
- The curriculum manual was used most extensively in C.S.D. 32 and least extensively in C.S.D. 18.

It is noteworthy that this is an increase of about 15 percent over the previous year. Conversely, in 1984-85, 35 percent of teachers reported using CIMS as a supplement to other curricula; in 1985-86, this number was reduced to 21 percent.

On the whole, three-quarters of the teachers reported using a text along with the CIMS manual for classwork. Of these 277 teachers, 86 percent said that they used it for additional classwork applications, 75 percent for homework, and 29 percent for quizzes.

Although 91 percent of the teachers reported that they were required to follow the sequence of objectives in the CIMS curriculum, 80 percent reported that they did so. C.S.D. 18 reported the lowest percentage of teachers following the sequence, 62 percent. Those who did not follow the CIMS sequence for the most part used their own sequence or a textbook sequence. Teachers made greater use of the teaching strategies in the manuals than the "Getting Started" activities: 45 percent of the teachers used the teaching strategies always or often, while only 30 percent used the "Getting Started" activities as frequently.

Assessment of Curriculum Manual. Teachers were asked how well they thought the CIMS curriculum manual presented math concepts and skills for their students. Table 3 presents survey responses to this question by pilot district. On the whole, 57 percent of the respondents believed that the manual presented math concepts and skills very well or satisfactorily. Only in C.S.D.s 1 and 12 did a majority of teachers say that it did so

TABLE 3

Ratings of the CIMS-Mathematics Curriculum Manual by General Education Teachers in the Pilot Districts

How Well Manual Presents Math Concepts & Skills	District 1 (N=88)	12 (N=49)	18 (N=62)	23 (N=64)	32 (N=68)	All Districts (N=331)
Very well	9%	18%	9%	14%	16%	13%
Satisfactorily	39	29	53	45	46	44
Poorly	51	41	30	38	37	39
Not at all	1	12	8	3	2	4

- Overall, 57 percent of teachers rated the manual's presentation of math concepts and skills satisfactory or better.
- Teachers in C.S.D.s 18, 23, and 32 gave the manual the highest ratings; teachers in C.S.D.s 1 and 12 the lowest.

poorly or not at all. This is a surprising finding for C.S.D. 1, where implementation of the curriculum has been a district priority. The large percentage of teachers (63 percent) rating the manuals satisfactory or better in C.S.D. 18 was also rather unexpected, given that district's historic preference for CIMS' predecessor, I.S.S.

Information gained from written comments made by teachers on the surveys and from teacher interviews shed light on the 160 teachers (43 percent) who were dissatisfied with the curriculum. Over 60 percent of all teachers completing the survey wrote in negative comments or criticisms of various aspects of the project. By far the greatest number concerned the sequencing of topics in the manuals: 74 teachers or 20 percent of all teacher respondents wrote that the sequence of objectives was illogical, jumped around, or assumed knowledge or skills that students did not have. In addition, nearly 10 percent of all respondents noted problems with the pacing of the curriculum, especially the need for additional time on topics.

On the whole, principals in the pilot districts rated the curriculum manuals more highly than did teachers. Sixty percent of the 20 principals thought they presented math concepts and skills very well, 25 percent thought the presentation was satisfactory, and only 15 percent thought it minimal. Principals in C.S.D. 18 were the least satisfied with the curriculum manuals.

Special Education. Special education teachers in the SEALL districts were somewhat less likely than their general education colleagues to have CIMS materials. In C.S.D. 1, 91 percent of 21 special education teachers received Part I of the manual, compared to 98 percent of the general education teachers, and only 73 percent of special education teachers received Part II, in contrast to 95 percent of the general education teachers. In C.S.D. 18, fewer than 70 percent of 13 special education respondents received either part of the manual. For CIMS student workbooks the situation was reversed. In C.S.D. 1, fewer special education than general education students had workbooks (81 to 86 percent); in C.S.D. 18, on the other hand, a greater percentage of special education students had them (69 to 29 percent).

In both SEALL districts, about half of the respondents reported that they followed the CIMS sequence of objectives. In general, special education teachers reported less extensive use of the CIMS curriculum manual than general education teachers. This was especially pronounced in C.S.D. 1, where 64 percent of the 22 special education teachers used the manual as a supplement to some other curriculum.

Special education teachers in the two SEALL districts rated the CIMS curriculum manual's presentation of math concepts and skills for their students similar to, but more strongly than, their general education colleagues: in C.S.D. 1, a greater percentage of special education than general education teachers rated the manual poor (60 to 52 percent); in C.S.D. 18, a greater

percentage rated it satisfactory or better (66 to 62 percent). Interviewed teachers in both districts were more negative than surveyed teachers about the appropriateness of the CIMS curriculum for special education students. Five of six teachers believed that the CIMS sequence of objectives did not group topics appropriately for their students; all six used another textbook sequence or their own. Special education supervisors in the two districts disagreed on the appropriateness of CIMS for special education students, one believing that special education teachers were resistant to CIMS because they needed to learn to challenge their students more (C.S.D. 1), and the other supporting the teachers' claims about the inadequacies of the curriculum (C.S.D. 18).

Staff Development

A major focus of the staff development component of CIMS-Mathematics was for the pilot districts to continue moving toward self-sufficiency in the ongoing operation of the project. The objective, therefore, was for district personnel, implementing the distinctive organizational model each district had developed for staff development over previous years, to carry out a plan of activities with only occasional assistance from CIMS central staff.

Questions on the end-of-year teacher survey were designed to obtain a detailed picture of the extent and kind of staff development activities available to teachers during the year.

Table 4 reports findings on the nature of the personnel (central CIMS, district, and school staff) from whom teachers received assistance with CIMS. In general, 320 or 93 percent of the respondents reported receiving some assistance with CIMS during the year. Table 5 presents findings on the type of staff development activities teachers attended. Compared to the previous year, teachers reported the same levels of staff development on understanding and teaching the curriculum and administering tests, more staff development devoted to using other instructional materials (68 to 46 percent), and less to interpreting test results (46 to 59 percent). In the following sections, these results, along with findings from the principal interviews, are discussed by district.

C.S.D. 1. The district math coordinator continued to assume primary responsibility for staff development in C.S.D. 1. He visited schools early in the year for lunchtime staff conferences and workshops, especially for new teachers, and was available to observe classes and meet individually with teachers. He also conducted staff development activities for assistant principals during the year.

Principals in C.S.D. 1 reported that in addition to the initial workshops, new teachers received assistance with CIMS at faculty and grade conferences. New teachers, however, were less likely than principals to rate their introduction to CIMS as adequate: only 39 percent of 23 new teachers reported that the

TABLE 4

General Education Teachers in the Pilot Districts Reporting Assistance with CIMS-Mathematics from Project, District, and School Staff[a]

Source of Assistance	District 1 (N=88)	12 (N=45)	18 (N=65)	23 (N=58)	32 (N=64)	All Districts (N=320)
Central CIMS staff	12%	20%	13%	15%	11%	15%
District staff	31	51	72	35	36	44
School administrators (A.P.s, principals)	53	62	52	49	26	48
Other school-based staff (math labs, teacher trainers)	14	31	27	52	83	41
Other[b]	25	20	23	17	22	22

[a]Percentages total more than 100% because of multiple responses.

[b]In nearly all cases, teachers specified the "other" source of assistance as fellow teachers.

- School administrators provided the greatest proportion of assistance across districts.
- School-based personnel were especially active in C.S.D.s 23 and 32.
- Central CIMS staff provided the smallest proportion of staff development, suggesting increased self-reliance on the part of the districts.

TABLE 5

General Education Teachers in the Pilot Districts
Reporting Attendance at Staff Development Activities[a]

Activity	District 1 (N=80)	12 (N=44)	18 (N=55)	23 (N=52)	32 (N=67)	All Districts (N=298)
Faculty conference	41%	45%	64%	44%	31%	44%
Grade conference	26	32	34	25	46	36
Workshop	26	18	18	27	24	23
Discussions with CIMS, district, or school staff	19	25	24	27	42	28
None	30	25	9	23	16	21

[a]Percentages total more than 100% because of multiple responses.

- On the whole, faculty and grade conferences were the most frequent forms of staff development.
- Twenty-one percent of teachers attended no staff development activities during the year.

introduction had been sufficient, lower than the average rate of 45 percent in the pilot districts.

As shown in Table 4, administrators (principals and assistant principals) provided the largest amount of staff training in C.S.D. 1; other staff, including the district math coordinator, assisted a smaller percentage of teachers than in other districts. Further, 30 percent of the respondents, the largest percentage of any district, said they had attended no staff development events (see Table 5). Three-quarters of these, in turn, said that this was because no activities were available.

C.S.D. 12. In C.S.D. 12's staff development model, the district math coordinator was responsible for staff development activities, assisted by a CIMS liaison in each school. In 1985-86, CIMS central staff agreed to provide staff training for district schools with the greatest number of new teachers. Teachers met at a central location for an all-afternoon workshop. Although a series of workshops was planned, arrangements for follow-up sessions were apparently not carried through by the district.

On the average, a greater percentage of teachers surveyed in C.S.D. 12 received assistance from school administrators and district personnel than in other districts (see Table 4). This was a surprising finding for C.S.D. 12 since previous evaluations conducted by O.E.A. questioned the extent to which district personnel provided ongoing staff development. On the other hand,

of four new teachers rating their introduction to CIMS, three found it inadequate.

C.S.D. 18. The district math coordinator was the main person responsible for staff development in C.S.D. 18, assisted by turnkey personnel in the schools. C.S.D. 18 targeted a number of topics for emphasis in staff training, such as the characteristics of a good math lesson and the art of questioning. In addition to staff development for teachers, conferences were conducted for principals and assistant principals on their role in improving math lessons. Central CIMS staff also conducted workshops for administrators on the use of the computer management reports for instructional planning.

C.S.D. 18's strategy for staff development appeared to be of some benefit. Of all districts, C.S.D. 18 had the smallest percentage of teachers (nine percent) reporting that no assistance was available, and the highest percentage (64 percent) attending faculty conferences on CIMS (Table 5). Also, nearly three-quarters of the respondents received assistance from district staff (see Table 4). However, although 67 percent of teachers received assistance with administering tests, only 40 percent reported staff development on interpreting test results, lower than the average across the districts. In addition, seven of eight new teachers in C.S.D. 18 found their introduction to CIMS inadequate.

C.S.D. 23. The staff development program in C.S.D. 23 was hampered by the lack of a math coordinator for a good part of the

year. Central CIMS staff provided training for school turnkey personnel (staff developers and assistant principals) at the beginning of the year, but the extent to which the schools met their responsibilities for follow-up was unclear.

Although respondents from C.S.D. 23 reported attendance at fewer staff development activities than their colleagues in other districts, school-based staff and administrators provided the greatest proportion of this assistance, as planned (Table 4). However, of nine new teachers, only four rated their introduction to CIMS adequate.

C.S.D. 32. The C.S.D. 32 staff development model involved the district math coordinator assisted by twelve math lab teachers operating as teacher trainers in the schools. During 1985-86 the district did not ask CIMS curriculum leaders for staff development assistance. C.S.D. 32's staff development model appeared to work well to a large extent. Surveyed teachers, as expected, received the greatest proportion of assistance from school-based staff (see Table 4) and in grade conferences and individual discussions (see Table 5). Of the pilot districts, teachers in C.S.D. 32 received the most staff development devoted to interpreting test results (54 percent). Further, 14 of 19 new teachers found their introduction to CIMS adequate, a far higher percentage than in any other district.

Special Education. In both SEALL districts, special education teachers were expected to attend staff development activities along with their general education colleagues. There

were no additional staff development activities planned specifically for special education teachers in C.S.D. 1, although the math coordinator met several times informally with the special education site supervisors. In C.S.D. 18, special education teachers were assisted primarily by their site supervisors, who contacted the math coordinator for assistance when needed.

Survey findings revealed that special education teachers in C.S.D. 1 received less assistance than general education teachers, while those in C.S.D. 18 received more. In addition, differences between special education teachers in the two districts were striking. Special education teachers in C.S.D. 18 received more assistance with CIMS than their colleagues in C.S.D. 1 from all groups: CIMS staff (64 to 14 percent), district staff (83 to 24 percent), school administrators (91 to 38 percent), and other school-based staff (40 to 19 percent). They were also more likely to have received assistance from their district special education supervisor (45 to 10 percent) and site supervisor (73 to 19 percent).

Testing

Use of Tests. Although two-thirds of surveyed teachers reported that they were required to use the CIMS tests, over 80 percent of the teachers reported that they actually did. This was an increase over the previous year, when two-thirds of the teachers reported doing so. C.S.D. 32 remained the leader in test use (94 percent), followed by C.S.D. 1 (88 percent). Teachers' use of tests increased in C.S.D. 18 to 76 percent from

60 percent in 1984-85. C.S.D. 23 was the only one in which test use remained the same (60 percent); this was the lowest reported use in a C.S.D. for 1985-86. One-half of the teachers in all districts reported that they administered the tests less frequently than once a month; 36 percent administered them once a month.

Thirty-two teachers who did not use the tests reported that tests were not available (C.S.D.s 1 and 23), were too difficult, long or inappropriate for students (C.S.D.s 1 and 18), or that tests or results were received late or not at all (C.S.D.s 1 and 23). Of 78 respondents from grades two and seven, exactly half reported that tests covering individual modules were available to them and, of these, 91 percent used them.

In the interviews, teachers expressed concern that district-mandated timetables or pacing schedules for tests might put pressure on them to advance to new topics before their students were ready. Of the 344 general education teachers surveyed, 65 percent reported that their district or school had a timetable or policy regarding the administration of tests; the majority of these teachers were in C.S.D.s 1 and 32. Principals in these two districts reported that their teachers were encouraged to keep to the timetables, but that their success varied according to the ability levels of their students. Several principals believed that the district timetables were unrealistic, given the need to review material and to make up for student and teacher absences. Teachers reported only partial success in keeping to these

timetables. Only 30 percent of 259 respondents said they had kept to the schedule, sometimes with difficulty.

Special Education. In both SEALL districts, slightly fewer special education teachers (70 percent) than general education teachers (82 percent) reported using the CIMS tests. Special education teachers in the interviews commented most frequently that the tests were too long or too difficult for their students; seven of the 36 surveyed teachers echoed this assessment. None of the special education teachers interviewed knew of or had used the CIMS placement tests, but, on hearing of them, expressed interest in using the tests to determine the appropriate curriculum level for their students.

Assessment of Tests. Revised CIMS tests for grades one and two were reviewed by a psychometrician for their coverage of curriculum objectives, degree of difficulty, adherence to basic principles of test construction, and quality of design and production. The tests included 29 individual module tests for grade one, 25 individual module tests for grade two, and 12 cumulative tests for grade two. As in previous assessments of CIMS tests, the reviewer was in general highly positive about the tests' construction and design, especially the excellent match of test items with performance objectives, good attention to test writing conventions, clear wording of items, and consistent number of items per objective. The excessive length of cumulative tests, a problem noted in an earlier review, appeared to have been solved.

Some problems cited in earlier reviews, however, were noted again: insufficient directions and practice items; and the overcrowding of pages. The reviewer also noted the tendency of some items to test the performance objectives too narrowly and questioned the sampling of content across objectives on the cumulative tests. Recommendations for the future included field testing all items, documenting procedures used for sampling particular objectives and units for testing, focusing on the full scope of the objective to be assessed in item development, and developing a practice test for use early in the year.

Implementation of the Computer Management Systems

A major objective for 1985-86 was for districts to become self-sufficient in the operation of the computer management system and to function with minimal technical assistance from the CIMS computer manager and the Office of Data Processing Coordination (O.D.P.C.). As part of their support of the project, CIMS and O.D.P.C. staff provided initial and ongoing training of personnel and continuing technical assistance to districts. The CIMS software was revised, a manual on its use was developed for operators, and changes were made in the class matrix report to make it more useful for teachers and administrators. Problems that continued to confront the district computer systems related to turnover in personnel, difficulties with updating the student databases, and problems with hardware or software.

An additional objective of the 1985-86 CIMS-Mathematics evaluation was to document more comprehensively than previously

the actual use of the computer management component by district staff, school administrators, and teachers. Following a brief description of the operation of the computer management system in each district, therefore, findings on the extent of use of the system by project participants are presented.

C.S.D. 1. CIMS central staff believed that C.S.D. 1 had made significant strides during the year toward full control of the computer management system. In general, the district computer manager and two full-time operators ran the system on a day-to-day basis with occasional technical assistance from CIMS and O.D.P.C. Difficulties encountered during the year involved moving the computer to a new room and problems with submission of information on students discharged or transferred. All test reports were generated in C.S.D. 1. The math coordinator in C.S.D. 1 reported that school supervisors made considerable use of the class matrix in providing feedback to teachers, but believed that teacher use for instructional purposes had been moderate.

C.S.D. 12. C.S.D. 12 was the only one of the five pilot districts that had not implemented the computerized testing system. The district used compilations of CIMS tests that were given four times a year and scored in the schools. Table 6 includes ratings by C.S.D. 12 teachers of the usefulness of scantron results for instructional planning; these are discussed in the section on use of the computer management reports.

C.S.D. 18. C.S.D. 18 had a larger minicomputer than the other districts and more extensive software that included other district functions. Turnover in district computer personnel and problems with new hardware and software reportedly led to the computer management system's late start in this district. Nevertheless, according to the district computer manager, by the end of the year the district was largely self-sufficient in operating the computer management system. The district was working on a plan to link a network of terminals in each school to the district system to facilitate data exchange, and in 1985-86, eight schools had such capabilities.

All test reports were generated in this district except the report of tests ordered and scored. The use and interpretation of the class matrix was a staff development focus in C.S.D. 18 during 1985-86. In addition to CIMS central staff meetings with principals and assistant principals on this topic, district computer personnel met with supervisors three or four times during the year on use of the system and interpretation of printouts. The district math coordinator believed that school supervisors (principals and assistant principals) made considerable use of the class matrix for monitoring instruction.

C.S.D. 23. Turnover in both the district computer staff and the district math coordinator affected the operation of the computerized testing system in C.S.D. 23. As a result of a lack of personnel to update the student database, and the need to train new staff members, the computer system was not fully

operational until mid-year. The district received assistance throughout the year from central CIMS staff, especially in training new staff members, and district staff foresaw the continued need for assistance, especially with the year-end update of the student database and equipment problems.

At the end of the year, the system in C.S.D. 23 was reportedly scoring fewer tests than it had the previous year. The class matrix was the only report generated consistently in C.S.D. 23. The math coordinator reported that both teachers and supervisors had made minimal use of the class matrix for instructional purposes because of delays in receiving the results and difficulties in understanding the matrix.

C.S.D. 32. C.S.D. 32 had an expanded computer system that handled many other district functions in addition to CIMS. The system was fully functional early in the school year and continued to be operational throughout the entire year. During 1985-86, the district added a laser printer and additional hardware, bringing the number of computers in its configuration to three. The district was largely self-sufficient in the day-to day operation of the system, receiving minimal assistance from CIMS and O.D.P.C. All management reports except the longitudinal report were generated in C.S.D. 32. The math coordinator reported that both supervisors and teachers made considerable use of the class matrix for instructional purposes.

Use of the Computer Management Reports

The evaluation sought to determine the extent to which the computer management component of the CIMS project was used. In general, principals believed that the computer management component of the project was useful for administration and supervision, assuming that it was administered properly and results were promptly received. In nearly all cases, however, principals did not specify its usefulness beyond stating that it "provides feedback on student progress" and "gives an overall picture." Although all but one district reported that superintendents reviewed the test management reports and provided feedback to principals about curriculum and test use, none of the principals interviewed knew what use their superintendent made of the reports.

In the interviews, only seven out of 24 teachers reported that they used the class matrices. Use of the reports was highest in C.S.D. 32, where teachers were most likely to find the return time adequate. The most frequent reason for lack of use in the other districts was delay in receiving the results. Teachers in C.S.D. 1 also reported they had no time to use the reports for review; in C.S.D. 18, teachers believed the tests and reports covered too much material to provide useful information.

Table 6 presents the survey findings on teachers' ratings of the usefulness of the class matrix for instructional purposes. In general, over half of these respondents rated the matrix very or moderately useful. The focus of staff development in

TABLE 6

Ratings of the Usefulness of the Class Matrix for Instructional Purposes by General Education Teachers in the Pilot Districts

	District					
Rating	1 (N=80)	12[a] (N=21)	18 (N=51)	23 (N=34)	32 (N=64)	All Districts[b] (N=229)
Very useful	10%	14%	18%	32%	22%	18%
Moderately useful	31	29	49	32	31	35
Minimally useful	38	19	26	27	36	32
Not at all useful	21	38	8	9	11	14

[a]Findings from C.S.D. 12 are ratings of the usefulness of scanning machine results included for comparison purposes.

[b]Does not include findings from C.S.D. 12.

- On the average, over half of the teachers found the class matrix useful for instructional planning.
- Teachers in C.S.D.s 18 and 23 gave the matrix the highest ratings.
- Scanning machine results were found to be less useful than the class matrix.

C.S.D. 18 on the interpretation and use of the matrix appeared worthwhile as C.S.D. 18 teachers found the matrix the most useful. Although C.S.D. 23 had reported the lowest rate of test use, those teachers who did use the tests gave the test reports a higher than average rating. In C.S.D. 1, where test use was among the highest, a minority of teachers found the matrix useful. Teachers from C.S.D. 12, where the scanning machine did not generate an item analysis, reported that the test results were less useful than did teachers in other districts who used the computerized reports.

Teachers were most likely to use the test data provided on the matrix to review material with the entire class or a small group of students (Table 7). Teachers in C.S.D.s 18 and 1 made the most use of the reports for individualizing instruction. Of 229 teachers responding to this question, roughly one-quarter reported that they did not use the reports.

Special Education. On the average, special education teachers in the SEALL districts made less use of the class matrix for instructional purposes and rated the CIMS computerized testing component less highly than did the general education teachers. Those who did use the matrices were most likely to use them to plan instruction for individual students than for the whole class or small groups. Findings were limited by the small number of special education teachers who used the CIMS tests.

TABLE 7

Use of the Class Matrix for Instructional Purposes by General Education Teachers in the Pilot Districts[a]

Type of Instruction	District 1 (N=78)	18 (N=51)	23 (N=34)	32 (N=64)	All Districts (N=229)
Entire class	24%	37%	44%	45%	38%
Small group	32	47	33	34	38
Individual students	37	45	25	23	35
Did not use	27	8	22	22	23

[a]Percentages total more than 100% because of multiple responses.

- Teachers were most likely to use the class matrix results for whole-class or small-group instruction.
- Teachers in C.S.D. 18 made the greatest use of the matrix for individualized instruction.
- One-quarter of the teachers across the districts did not use the matrix.

Commitment to CIMS

Project participants were asked to rate their commitment to the ongoing use of the CIMS manual, tests, and test management system. Survey findings were compared with those from the previous year. Table 8 shows that, on the average, commitment to the CIMS curriculum manual increased from 1984-85 to 1985-86. This was especially noteworthy in C.S.D.s 23 and 12. C.S.D. 32 continued to be the most committed to CIMS, although the rate of commitment did not change from the previous year.

Commitment to the CIMS tests increased only slightly, specifically in C.S.D.s 1, 12, and 23. Commitment to the computer management system, on the other hand, was less than the previous year. This was most noticeable in C.S.D.s 32 and 1, although of all the districts, C.S.D. 32 continued to be the most committed to the computer management system. C.S.D. 23 was the only district that registered a small increase in commitment.

All principals rated themselves very or moderately committed to CIMS. Principals in C.S.D.s 1 and 32 were most committed; commitment was most restrained in C.S.D. 18, where three of five principals were moderate in their commitment. Principals were likely to believe that their superintendents were very committed to the continued use of CIMS, although seven principals in C.S.D.s 12, 18, and 23 were unwilling or unable to rate their superintendent's level of commitment. In general, principals found their school supervisors very committed (C.S.D.s 12, 23, and 32) or moderately committed (C.S.D. 1 and 18), and their

TABLE 8

Mean Ratings[a] of Pilot District Teachers' Commitment to CIMS-Mathematics by District, 1984-85 and 1985-86

Commitment to CIMS Component	District 1		12		18		23		32		All Districts	
	1984-85 (N=36)	1985-86 (N=88)	1984-85 (N=45)	1985-86 (N=45)	1984-85 (N=33)	1985-86 (N=64)	1984-85 (N=25)	1985-86 (N=61)	1984-85 (N=39)	1985-86 (N=68)	1984-85 (N=178)	1985-86 (N=326)
Curriculum manual	2.4	2.5	2.0	2.6	2.4	2.6	1.7	2.5	2.8	2.8	2.3	2.6
Tests	2.0	2.1	1.9	2.2	2.1	2.1	1.9	2.0	2.7	2.7	2.1	2.2
Computer management system	2.0	1.8	---	--[b]	2.1	2.0	1.7	1.8	3.0	2.5	2.3	2.0

[a] Rating scale: 1 = not at all committed; 2 = minimally committed; 3 = moderately committed; 4 = very committed.
[b] The computer management system was not implemented in C.S.D. 12.

- While overall commitment to CIMS remains minimal to moderate, commitment to the curriculum manual and tests have increased, and commitment to the computer management system has decreased.
- C.S.D.s 12 and 23 have shown the greatest increase in commitment to CIMS-Mathematics.

teachers moderately committed (C.S.D. 12 and 32) or minimally committed (C.S.D.s 1, 18, and 23) to CIMS.

Special Education. In general, the 22 special education teachers in C.S.D. 1 were much less committed to the CIMS manual, tests, and computer management system than were general education teachers. Nearly three-quarters rated themselves minimally or not at all committed to the manual; 95 percent were minimally or not at all committed to the tests and computer management system. In C.S.D. 18, on the other hand, two-thirds of the 12 special education teachers were moderately committed to the manual, and 45 percent were moderately committed to the tests. These findings are slightly higher than those for general education teachers in C.S.D. 18. Commitment to the computer management system by special education teachers in C.S.D. 18, however, was very low: ninety percent were uncommitted to it.

NON-PILOT DISTRICT IMPLEMENTATION

The major areas of interest in the evaluation of the non-pilot districts were the nature and extent of introductory and ongoing staff development support to district personnel, the availability and use of the CIMS curriculum materials and other instructional resources, and participants' assessment of and commitment to the CIMS project.

Staff Development

When CIMS is implemented in a new district, project and district staff devise a mutual plan of action tailored to the

needs and organization of the specific district. It is expected that the district, and specifically the math coordinator, will take responsibility for ongoing staff development and support following initial training by CIMS staff. The staff development plans of the three new districts examined in the 1985-86 evaluation are described in this section, along with findings from the teacher surveys and principal interviews.

C.S.D. 8. The superintendent in C.S.D. 8 selected CIMS-Mathematics at the recommendation of a district math committee seeking a standard math curriculum meeting the state-mandated mathematics requirements. In May, 1985 central CIMS curriculum leaders conducted a series of workshops for principals, assistant principals, and teacher trainers. These workshops were replicated in individual schools by the math coordinators and teacher trainers at faculty and lunchtime conferences. Staff development activities for 1985-86, based on a needs assessment conducted by the math coordinators, were conducted during two weeks in November. Sessions were led by CIMS curriculum leaders and district teacher trainers; teachers who attended these sessions were expected to return to their schools and play the role of turnkey trainers.

Principals' ratings of the adequacy of the introduction seemed to be related to the extent to which the school-based teacher trainers or assistant principals were prepared to follow up with demonstrations, staff conferences, or individual discussions in their schools: two were satisfied and two were not. In

general, teachers in C.S.D. 8 reported the highest level of participation in staff development activities of the three new districts. Survey findings showed that they were most likely to have received assistance with CIMS from district and school-based staff (Table 9). Nearly three-quarters of the respondents had attended faculty conferences where CIMS was discussed; only two percent had attended no activities (Table 10). In all, 79 percent of the respondents from C.S.D. 8 found their introduction to CIMS adequate; this was significantly higher than the other non-pilot districts ($p < .01$).

C.S.D. 15. C.S.D. 15 began plans to implement CIMS-Mathematics, including the computer management component, in four schools in 1984-85. Computer and personnel problems prevented the system from becoming operational that year, and the decision was made to use the CIMS curriculum manuals districtwide in 1985-86. CIMS curriculum leaders provided initial staff training for kindergarten and first-grade teachers during staff development days at the beginning of the school year. In September and October, CIMS staff and the district math coordinator visited individual schools for grade conferences on the CIMS cyclical approach, lesson planning, and spiraling homework; a workshop for supervisors was conducted at mid-year. The district math coordinator was responsible for follow-up staff development in the schools.

Principals in C.S.D. 15 whose schools had on-site mathematics supervisors were more likely to find the introduction to

TABLE 9

Non-Pilot District Teachers
Reporting Assistance with CIMS-Mathematics from Project, District, and School Staff[a]

Source of Assistance	District 8 (N=131)	15 (N=87)	30 (N=80)	All Districts (N=298)
Central CIMS staff	30%	46%	16%	32%
District-level staff	83	72	41	69
School administrators (principals, A.P.s)	56	63	59	60
Other school-based staff (teacher trainers, math lab teachers)	71	9	17	40
Other staff[b]	30	23	10	20

[a]Percentages total more than 100% because of multiple responses.

[b]In nearly all cases, teachers specified "other staff" as fellow teachers.

- Overall, the largest percentage of teachers received assistance from district staff and school administrators.
- Amount of assistance with CIMS varied by district; on the whole, teachers in C.S.D. 8 received the most assistance and teachers in C.S.D. 30 the least.

TABLE 10

Non-Pilot District Teachers
Reporting Attendance at Staff Development Activities[a]

Type of Activity	District 8 (N=138)	15 (N=92)	30 (N=88)	All Districts (N=318)
Faculty conferences	72%	47%	28%	53%
Grade conferences	51	57	51	53
Workshops	53	54	32	48
Individual discussion with CIMS, district, or school staff	41	25	17	30
None	2	5	16	7

[a]Percentages total more than 100% because of multiple responses.

- On the whole, faculty and grade conferences were the most frequent forums of staff development.
- Attendance at staff development activities varied by district; teachers in C.S.D. 8 received the greatest amount of assistance with CIMS and teachers from C.S.D. 30 the least.

CIMS in their school adequate; presentations by the district math coordinator or central CIMS staff were not found to be sufficient without additional and ongoing on-site support. Nearly all teachers in C.S.D. 15 attended some staff development activity where CIMS was discussed. Although the greatest amount of assistance was received from district staff and school administrators, CIMS staff developers were more active here than in any other non-pilot district (Table 9). In spite of the district's efforts, however, only 58 percent of the respondents in C.S.D. 15 found their introduction to CIMS adequate.

C.S.D. 30. CIMS curriculum leaders provided introductory staff development on CIMS to all kindergarten and first-grade teachers in C.S.D. 30 at the beginning of the school year. For the other grades, representatives from each school attended a series of workshops at a central site. These teachers were then expected to return to their schools, distribute the curriculum manuals, and provide turnkey training to other teachers at school workshops, with follow-up assistance provided by the math coordinator where needed. In C.S.D. 30, CIMS was presented as a resource to be used with flexibility, with teachers adapting it to their own needs. The math coordinator spoke about CIMS at a principals' meeting, but apart from this there was no introduction or staff development specifically for supervisors or administrators in the district.

Principals from C.S.D. 30 reported that the introduction to CIMS at their schools had been adequate. Of the three non-pilot

districts, teachers in C.S.D. 30 reported the lowest amount of staff development (see Table 9). They were most likely to have received assistance with CIMS from school administrators, although there was little staff development on CIMS for school administrators in this district. Only 16 percent of the respondents had attended a staff development activity where a central CIMS staff member was present. Most assistance with CIMS was provided at grade conferences (Table 10). Despite the perceptions of principals, only 52 percent of the respondents in C.S.D. 30 found their introduction to CIMS adequate.

Curriculum

Availability of Materials. Nearly all teachers in the three non-pilot districts received both parts of the teacher's manual in 1985-86. District policy on the purchase of CIMS student workbooks varied. In C.S.D. 8, workbooks were purchased for all students. In addition, the district superintendent requested and received from CIMS Spanish-language editions of the workbooks that were duplicated and bound by the district. Although C.S.D. 15 left the decision to purchase the workbooks to the schools, only nine teacher respondents from this district had them. Of the 177 teachers in the three districts whose students did not have workbooks, 70 percent reported that they made copies of the worksheets in the teacher's manual: 80 percent of the teachers in C.S.D. 15 and 60 percent in C.S.D. 30.

On the average, three-quarters of the classes in the districts had other mathematics textbooks, and 60 percent had other student workbooks. Although slightly over half of all responding teachers had manipulative materials, this varied widely among the districts: 71 percent of the respondents from C.S.D. 8 had these materials, but only 33 percent of those from C.S.D. 30 had them.

Curriculum Use. All aspects of curriculum use varied among the three non-pilot districts, with C.S.D. 8 reporting the most extensive use of project components and C.S.D. 30 the least. Overall, 84 percent of the respondents reported following the CIMS sequence of objectives, slightly more than in the pilot districts. This varied, however, from 97 percent in C.S.D. 8 to 64 percent in C.S.D. 30. Although a large majority of teachers in C.S.D.s 8 and 15 said that they were required to use the sequence, only 69 percent of teachers in C.S.D. 30 reported that this was the case. Teachers who did not follow the CIMS sequence were most likely to use their own sequence; fewer used a textbook sequence or an earlier scope and sequence.

Similar district variation was found in the ways teachers used the CIMS curriculum manual for lessons (Table 11.) Overall, 56 percent of the teachers used the manual as the principal text supplemented by other materials. C.S.D. 8 reported the most extensive use of the manual, with 75 percent of the teachers reporting that they used it as the principal text. In C.S.D. 30, on the other hand, one-third of the respondents used CIMS as an

TABLE 11

Use of the CIMS-Mathematics Curriculum Manual
by Non-Pilot District Teachers

Use of Manual	District 8 (N=137)	15 (N=92)	30 (N=87)	All Districts (N=316)
Only CIMS	9%	5%	5%	7%
CIMS as primary curriculum manual	75	53	28	56
CIMS & other curricula equally	14	21	32	21
CIMS as supplement to other curricula	2	21	33	16

- Three-quarters of the teachers in all districts used CIMS as the primary curriculum or equally with another.
- C.S.D. 8 reported the most extensive use of CIMS and C.S.D. 30 the least extensive.

adjunct to some other curriculum, and only 28 percent used it as the principal text. In general, teachers used the teaching strategies in the teacher's manual more frequently than the "Getting Started" activities. Over half of the teachers used the teaching strategies "always" or "often," but only one-third used the "Getting Started" activities as frequently. These findings followed the same pattern of district variation. In the non-pilot districts, teachers whose students had workbooks were significantly more likely to use the strategies ($p<.01$).

Assessment of Curriculum Manual. Teachers' ratings of the curriculum manual's presentation of mathematics concepts and skills are presented in Table 12. Three-quarters of the respondents found this presentation very good or satisfactory. This was quite a bit higher than in the pilot districts, where 56 percent of the respondents answered similarly (Table 3). The highest ratings were found in C.S.D. 30 and the lowest in C.S.D. 8, where one-third of the respondents rated the manual poor.

Written comments on the surveys serve to illuminate the teachers' criticisms of the curriculum manual. Like their colleagues in the pilot districts, a large number (186 teachers or 59 percent) responded to a question asking them for additional comments about the CIMS-Mathematics Project. These teachers made 206 negative and 19 positive comments about the curriculum manual. Cited most often were problems with the sequencing of objectives: close to one-third of those teachers making comments made this criticism, and nearly one-quarter (23 percent) found

TABLE 12

Ratings of the CIMS-Mathematics Curriculum Manual by Non-Pilot District Teachers

How Well CIMS Manual Presents Math Concepts & Skills	District 8 (N=133)	15 (N=91)	30 (N=86)	All Districts (N=310)
Very well	14%	18%	29%	19%
Satisfactory	54	60	56	56
Poorly	31	22	12	23
Not at all	1	-	4	1

- On the whole, three-quarters of the teachers in the non-pilot districts rated the curriculum manual satisfactory or better.
- Teachers in C.S.D. 30 gave the manual the highest ratings and teachers in C.S.D. 8 the lowest.

that the suggested pacing of the curriculum was unrealistic and that more time was needed for topics. In addition, 15 teachers reported that the curriculum manual did not sufficiently account for the differing ability levels of students.

Principals interviewed in the non-pilot districts were generally satisfied with CIMS as a mathematics curriculum. Of ten principals, three found that the manual presented mathematics concepts and skills "very well," five "satisfactorily," and two "minimally." They reported that it was especially good for new teachers and those not adequately prepared in mathematics. Even those who were satisfied with the curriculum, however, cited problems with flexibility or scheduling, finding it was too restrictive for experienced teachers who should rely on their own judgment about the pacing or order of topics. It was suggested that gaps in preparation of students from grade to grade could have been alleviated by implementing the project in the early grades first and adding additional grades from year to year. Principals who judged its adequacy minimal cited the disjointed sequencing of topics and numerous errors in the manuals.

Commitment to CIMS*

Table 13 presents the survey findings on teachers' commitment to the ongoing use of CIMS. Over 60 percent of all respondents reported that they were very or moderately committed

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*Chi-square coefficients were computed to determine the statistical significance of the relationships in this section.

TABLE 13

Commitment to the CIMS-Mathematics Project Reported by Non-Pilot District Teachers

Level of Commitment	District 8 (N=134)	15 (N=91)	30 (N=87)	All Districts (N=312)
Very committed	28%	18%	10%	20%
Moderately committed	43	37	49	43
Minimally committed	19	32	24	24
Not at all committed	11	13	16	13

- Over 60 percent of the teachers across the districts were very or moderately committed to the curriculum.
- C.S.D. 8 had the highest level of commitment and C.S.D. 30 the lowest.

to CIMS. These findings varied by district in ways parallel to the implementation of various aspects of the curriculum: teachers in C.S.D. 8 showed the greatest commitment, and those in C.S.D. 30 the lowest ($p<.01$). A comparison of these findings with those of the pilot districts (Table 8) showed no meaningful differences in ratings; the mean rating for the non-pilot districts was 2.7, compared to 2.6 for the pilot districts.

Of the various aspects of the CIMS-Mathematics Project, the one that appeared to be the most related to commitment to the curriculum was staff development. Teachers who found their introduction to CIMS adequate were significantly more committed to the curriculum than those who did not ($p<.01$). Assistance with CIMS from district staff ($p<.01$) and from school-based staff ($p<.01$) was significantly related to commitment to CIMS; staff training from CIMS central staff and school administrators also tended in this direction, although the relationship was not statistically significant. The other aspect of CIMS that was significantly related to teachers' commitment was the availability of student workbooks ($p<.01$).

Most of the ten principals interviewed in the non-pilot districts reported that they were very or moderately committed to CIMS (five and four, respectively); one was minimally committed. Principals tended to rate their superintendents as very committed, except in C.S.D. 30, where two of the four principals believed that the superintendent was moderately committed. The math coordinator confirmed this assessment, citing the unaccept-

able number of errors in the manuals. In general, principals believed that their school supervisors were more committed to the project than were their teachers.

STUDENT ACHIEVEMENT

The effect of the CIMS-Mathematics curriculum on student achievement was examined by analyzing students' Total Mathematics scores on the New York City Mathematics Test and the Metropolitan Achievement Test* in two ways. First, longitudinal trends in students' N.C.E. scores in the five pilot districts (C.S.D.s 1, 12, 18, 23, and 32) for spring 1983, 1984, 1985, and 1986 were analyzed for three cohort groups. The trends were analyzed to determine whether the CIMS curriculum had a frontline impact on student achievement during this period.

Second, the spring, 1986 scores of students in the three non-pilot districts (districts new to the program) examined in the evaluation (C.S.D.s 8, 15, and 30) were compared with the spring, 1986 scores of students in two sets of districts that had recently adopted other approaches to mathematics instruction. C.S.D.s 14 and 19 each developed and implemented a localized instructional program (Model A) which, like CIMS-Mathematics, was based on the Mathematics Scope and Sequence (New York City and State curriculum guidelines) and included teacher and student

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*In spring 1983, 1984, and 1985, the New York City Mathematics Test was administered to New York City public school students. This test was changed in spring, 1986 to the Metropolitan Achievement Test. Scores presented in this report have been statistically equated so that valid comparisons can be made.

materials. While staff development was provided, neither program included a computerized test management system.

In C.S.D.s 16 and 17, the teachers followed the Mathematics Scope and Sequence, but there were no district-prescribed teacher strategies or student materials (teachers used various textbooks) or staff development support; this was designated Model B. These analyses helped to compare the impact of the CIMS Math program to other mathematics programs.

Longitudinal Trends

Cohort Analyses. Three cohorts in the five pilot districts* were included in these analyses: students who were in grade two in 1983 and grade five in 1986; those who were in grade three in 1983 and grade six in 1986; and those who were in grade four in 1983 and grade seven in 1986. Mean N.C.E. scores were computed for each cohort group for consecutive years beginning spring, 1983.

Table 14 presents the results of CIMS cohort analyses by district and cohort group. A profile for each district based on these findings revealed the following.

- C.S.D. 1. The fifth-grade cohort group dropped 3.8 N.C.E.s from 1983 to 1984, but increased 8.7 N.C.E.s in 1985 and 4.4 N.C.E.s in 1986. The sixth-grade cohort generally experienced an upward trend from 1983 to 1986. The seventh-grade cohort showed an upward trend from 1983

*Overall findings for all districts combined are not presented, because implementation of all CIMS curriculum is not standard. Thus, it is important to study student achievement in each district.

to 1985, but experienced the "seventh-grade drop"* in 1986. In general, all C.S.D. 1 cohort groups showed gains by spring, 1986.

- C.S.D. 12. The fifth-grade cohort dropped 2.8 N.C.E.s from 1983 to 1984, gained 7.7 N.C.E.s in 1985, and did not change in 1986. The sixth-grade cohort gained 1.3 N.C.E.s from 1983 to 1984, dropped 0.9 N.C.E.s in 1985, and gained 2.4 N.C.E.s in 1986. The seventh-grade cohort showed a downward trend in the three-year period from 1983 to 1986. Overall, two cohort groups in C.S.D. 12 showed an upward trend from 1983 to 1986, while the seventh-grade cohort group decreased every year.

- C.S.D. 18. The fifth-grade cohort group dropped 1.2 N.C.E.s from 1983 to 1984 and showed an upward trend in 1985 and 1986. The sixth-grade cohort showed a general upward trend from 1983 to 1986. The seventh-grade cohort group showed an upward trend from 1983 to 1985, but experienced the "seventh-grade drop" in 1986. In general, the three cohort groups from C.S.D. 18 showed gains from 1983 to 1986.

- C.S.D. 23. The fifth-grade cohort group showed gains from 1983 to 1985, but dropped 2.9 N.C.E.s in 1986. The sixth-grade cohort group gained 5.8 N.C.E.s in 1984, but showed downward trends in 1985 and 1986. The seventh-grade cohort group showed no change in 1984, gained 1.2 N.C.E.s in 1985, and dropped 4.4. N.C.E.s in 1986. Overall, two of the cohort groups in C.S.D. 23 showed gains from 1983 to 1986, while one cohort group decreased 3.1 N.C.E.s in the three-year interval.

- C.S.D. 32. The fifth-grade cohort group dropped 7.1 N.C.E.s in 1984, but showed an upward trend in 1985 and 1986. The sixth-grade cohort group showed a general upward trend from 1983 to 1986, while the seventh-grade cohort group experienced a downward trend over the three-year period. In general, the fifth- and sixth-grade cohort groups in C.S.D. 32 showed gains, while the seventh-grade cohort group experienced a drop of 6.5 N.C.E.s from 1983 to 1986.

Graphic representations for each district are presented in the Appendix.

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*In general, when students move from sixth to seventh grade, they experience a decrease ("drop") in their test scores.

TABLE 14

Pilot Districts Cohort Analyses for 1983-1986 by District and Group

District	Grade in 1986	N	Spring 1983 Mean	Spring 1983 S.D.	Spring 1984 Mean	Spring 1984 S.D.	Spring 1985 Mean	Spring 1985 S.D.	Spring 1986 Mean	Spring 1986 S.D.	Mean Diff. 1983-84	Mean Diff. 1984-85	Mean Diff. 1985-86	Mean Diff. 1983-86
1	5	309	41.3	25.4	37.5	25.1	46.2	23.3	50.6	21.5	-3.8	8.7	4.4	9.3
	6	374	37.6	22.7	46.6	22.2	46.1	24.1	54.2	21.6	9.0	-0.5	8.1	16.6
	7	276	39.1	18.3	39.6	17.9	44.9	19.0	41.8	14.3	0.5	5.3	-3.1	2.7
12	5	561	42.3	21.2	39.5	21.9	47.2	22.8	46.7	20.0	-2.8	7.7	-0.5	4.4
	6	536	47.1	24.0	48.4	21.2	47.5	25.2	49.9	21.9	1.3	-0.9	2.4	2.8
	7	344	44.6	17.7	42.6	19.8	41.4	21.0	40.4	15.6	-2.0	-1.2	-1.0	-4.2
18	5	662	57.4	27.3	56.2	29.3	61.4	26.0	63.8	23.4	-1.2	5.2	2.4	6.4
	6	652	55.6	27.8	61.7	25.5	61.4	26.0	66.4	19.7	6.1	-0.3	5.0	10.8
	7	504	52.8	22.5	54.7	21.7	55.6	20.7	53.5	18.6	1.9	0.9	-2.1	0.7
23	5	417	43.3	25.4	46.0	25.6	47.8	24.1	44.9	18.2	2.7	1.8	-2.9	1.6
	6	408	44.7	24.2	50.5	22.7	49.6	22.8	49.2	20.1	5.8	-0.9	-0.4	4.5
	7	373	41.6	18.4	41.7	19.2	42.9	18.5	38.5	15.2	0.1	1.2	-4.4	-3.1
32	5	579	43.9	24.9	36.8	24.5	45.9	24.3	46.9	18.4	-7.1	9.1	1.0	3.0
	6	546	40.4	24.9	46.6	23.5	46.0	22.8	46.8	19.0	6.2	-0.6	0.8	6.4
	7	503	48.2	21.0	45.5	19.4	43.4	19.7	41.7	15.8	-2.7	-2.1	-1.7	6.5

- The fifth and sixth grade cohort group for the pilot districts showed gains from 1983 to 1986.
- C.S.D.s 1 and 18 showed the most consistent upward trends from 1983 to 1986.

CIMS Versus Non-CIMS Mathematics Programs

The impact of CIMS-Mathematics on students in the three non-pilot districts (C.S.D.s 8, 15, and 30) was compared to the impact of other mathematics programs in four other districts. C.S.D.s 16 and 17 (Model A) were chosen to represent programs that only followed the Scope and Sequence guidelines, whereas C.S.D.s 14 and 19 (Model B) were examples of a mathematics program similar to CIMS, but with no computer management system. Analyses of covariance were computed to determine the statistical significance of differences in the spring, 1986 scores among the three groups of districts, controlling for initial differences at pretest (spring, 1985).

Table 15 presents the results of the comparisons of the achievement of students in C.S.D.s 8, 15, and 30 with students participating in the programs represented by Model A (C.S.D.s 16 and 17) and Model B (C.S.D.s 14 and 19). As shown in this table:

- C.S.D. 8 showed significantly higher spring, 1986 scores in grades three and seven than the comparison groups.
- C.S.D. 15 showed significantly higher spring, 1986 scores in grades three, four, and five than the comparison groups. In addition, posttest scores in this non-pilot district were significantly higher than those of Model A in grades 6 and 7.
- All grades in C.S.D. 30 showed significantly higher spring, 1986 math scores than the control groups.
- In general, non-pilot CIMS districts outperformed other math programs at all grade levels.

TABLE 15

Analyses of Covariance on Spring, 1986 Total Mathematics Scores for CIMS-Mathematics Non-Pilot Districts and Non-CIMS Mathematics Students by District and Grade

District	Grade	CIMS-MATH N	CIMS-MATH Adjusted Mean	CIMS-MATH S.D.	MODEL A[b] N	MODEL A[b] Adjusted Mean	MODEL A[b] S.D.	MODEL B[c] N	MODEL B[c] Adjusted Mean	MODEL B[c] S.D.	Mean Difference Between CIMS and Model A	Mean Difference Between CIMS and Model B
8	3	1,152	50.2	22.3	2,217	48.5	21.8	2,489	48.4	21.9	1.7[a]	1.8[a]
	4	912	53.4	21.0	1,689	54.5	20.5	2,126	53.5	21.2	-1.1	-0.7
	5	714	54.1	21.5	1,402	54.1	20.3	1,739	54.3	22.3	0.0	-0.2
	6	737	57.3	19.3	1,278	54.7	18.5	1,637	57.8	22.1	2.6[a]	-0.5
	7	732	48.0	17.5	1,067	45.8	15.7	1,688	46.0	17.6	2.2[a]	2.0[a]
15	3	1,293	51.6	22.5	2,217	48.5	21.8	2,489	48.4	21.9	3.1[a]	3.2[a]
	4	1,036	55.8	21.7	1,689	54.5	20.5	2,126	53.5	21.2	1.3[a]	2.3[a]
	5	946	57.0	21.4	1,402	54.1	20.3	1,739	54.3	22.3	2.9[a]	2.7[a]
	6	810	58.6	20.6	1,278	54.7	18.5	1,637	57.8	22.1	3.9[a]	0.8
	7	544	46.9	20.4	1,067	45.8	15.7	1,688	46.0	17.6	1.1[a]	0.9
30	3	1,214	53.2	22.3	2,217	48.5	21.8	2,489	48.4	21.9	4.7[a]	4.8[a]
	4	1,062	58.9	23.2	1,689	54.5	20.5	2,126	53.5	21.2	4.4[a]	5.4[a]
	5	881	56.8	22.1	1,402	54.1	20.3	1,739	54.3	22.3	2.7[a]	2.5[a]
	6	853	59.2	22.3	1,278	54.7	18.5	1,637	57.8	22.1	4.5[a]	1.4[a]
	7	640	48.2	19.4	1,067	45.8	15.7	1,688	46.0	17.6	2.4[a]	2.2[a]

[a] These differences were significant at $p<.05$.

[b] Refers to the instructional models developed in C.S.D.s 14 and 19, which like CIMS, are based on the Mathematics Scope and Sequence and include teacher and student materials, but no computer management system.

[c] Refers to the instructional model followed in C.S.D.s 16 and 17, in which teachers followed the Mathematics Scope and Sequence, but there were no district-prescribed strategies or materials.

- CIMS-Math students in C.S.D.s 15 and 30 outperformed students in Model A and Model B at all grade levels in spring, 1986.

V. CONCLUSIONS AND RECOMMENDATIONS

The CIMS-Mathematics Project was implemented in varying ways in both the pilot and non-pilot districts in 1985-1986. In all districts, it was associated on the whole with student gains in mathematics achievement.

PILOT DISTRICTS

In the pilot districts, the project was generally successful in promoting district self-sufficiency in the management of project activities. Apart from some initial staff development assistance and ongoing computer system support from CIMS project staff, the districts were largely responsible for the operation of the project during the year. Problems that arose were most frequently due to turnover or absence of district staff, such as the math coordinator in C.S.D. 23. Overall, districts implemented staff development programs based on the organizational models they had developed over several years; CIMS curriculum leaders, as intended, were rarely active in the pilot districts during the year.

Teacher survey data revealed that teachers were making more extensive use of the curriculum manuals and tests than in previous years, but continued to express reservations about them. Curriculum use increased in all districts except C.S.D. 32; nevertheless, C.S.D. 32 still led the districts in this area. Although a majority of teachers (57 percent) rated the manuals' presentation of mathematics concepts and skills satisfactory or

better, 43 percent of teachers remained dissatisfied with the manuals. Since the revision process proceeded slowly, teachers remained critical of the sequencing of objectives and pacing of the curriculum. It is thus fortunate that the project intends to revise both the third-and fourth-grade manuals in 1986-1987. Of second-grade teachers who had used both the old and revised versions of the manual during the current year, 60 percent believed that the revised edition was an improvement.

Teachers continued to find the amount of time given to topics in the manuals insufficient. This could be related either to the increasing number of topics included in the manuals, as the project responded to state-mandated requirements, or to teachers' continued lack of understanding and acceptance of the "cyclical" instructional approach.

The percentage of teachers using the CIMS tests rose to over 80 percent from 67 percent the previous year; the extent to which the computerized management reports were actually used is less clear. Although fifty-three percent of survey respondents reported that the class matrix was useful for instructional purposes, a smaller percentage of interviewed teachers reported using them consistently because of delays in receiving test results and lack of time to review.

Comments of both teachers and principals on the need for prompt test results make a good case for continuing to explore the use of school-based microcomputers for CIMS. The emphasis of many principals and teachers on the computer management system

for student evaluation, however, reveals their lack of understanding of the role of the computerized testing system in instructional planning. Survey results showed that teachers actually received less staff development on interpreting test results during 1985-86 than previously. Teachers who said they did not use the reports because they had no time to review material in class may point to a need for continued assistance with the cyclical approach and spiraling homework.

C.S.D. 18, a district with a strong history of mathematics achievement, mounted the most ambitious staff development program in 1985-86 and appeared to reap the benefits. Curriculum and test use was up, and teachers gave the highest ratings to the computer management system. The student achievement cohort analyses showed steady student growth in C.S.D. 18 across three years. C.S.D. 1, which had made a major district commitment to the project, showed similar cohort gains across the three years. Higher rates of teacher dissatisfaction in this district may be related to the low level of continued staff development support.

C.S.D.s 12 and 32 showed cohort gains for fifth- and sixth-graders, but continued losses by the seventh-grade cohort. Students in C.S.D. 23 showed a similar pattern over the three years, although all three cohorts lost ground from 1985 to 1986, perhaps reflecting the disruption to the project caused by the lack of a mathematics coordinator for most of the year. All in all, participation in CIMS has been associated with continued gains in student mathematics achievement in the pilot districts.

Special Education

Special education teachers in the SEALL districts, C.S.D.s 1 and 18, were somewhat less likely to have the CIMS manuals than their general education colleagues and were more likely to use them as a resource in conjunction with other materials. Special education teachers found the cumulative tests too long or difficult for their students, and were uncommitted to the computerized testing system for special education. The findings from C.S.D.s 1 and 18 showed that staff development was related to teachers' commitment to the project. Staff development efforts should continue to be focused on adapting the curriculum to the needs of special education students, with emphasis on the use of individual tests, where available.

NON-PILOT DISTRICTS

The three districts new to CIMS formulated distinctive staff development plans and varied consistently in the extent to which they implemented project components. In general, the greater satisfaction with CIMS reported in the new districts may show the extent to which project staff have refined their procedures for introducing CIMS into new districts over the years.

The amount of staff development assistance and extent of use of the manuals varied from district to district: C.S.D. 8 made the greatest commitment to the project; C.S.D. 30 presented it as a resource to be used with flexibility. Satisfaction with the manuals varied inversely to the level of commitment, perhaps reflecting the fact that teachers in districts which make a major

commitment to CIMS as their standard curriculum are more sensitive to its flaws. Nevertheless, commitment to the ongoing use of CIMS was highest in C.S.D. 8 and appeared to be related to extent of staff development by school-based and district staff.

Students in the three non-pilot districts outperformed their peers in districts with both structured and unstructured math programs to a statistically significant degree in 23 out of 30 within-grade comparisons. Students in C.S.D. 30 made the greatest gains. There was thus no one-to-one relationship between extent of implementation of project components and advances in student mathematics achievement by district. Because of its nature as an adaptable curriculum, CIMS is especially sensitive to local conditions and history of ongoing commitment to mathematics. Nevertheless, the findings show that CIMS has had a significant impact on participants' mathematics achievement in both pilot and non-pilot districts. Continued assessment of the effectiveness of CIMS-Mathematics should relate the project's operation more closely to details of implementation and integration with other programs and support activities in individual schools and classrooms.

RECOMMENDATIONS

In order to promote the continued improvement of the project, the following recommendations are made:

- Districts should continue staff development and support for teachers, focusing especially on the cyclical approach to instruction and using the management reports. Greater attention to the introduction of new teachers to CIMS is necessary.

- Given the complexities of implementing centralized computer systems in the districts, CIMS project staff should continue to explore the use of school-based microcomputers for CIMS.

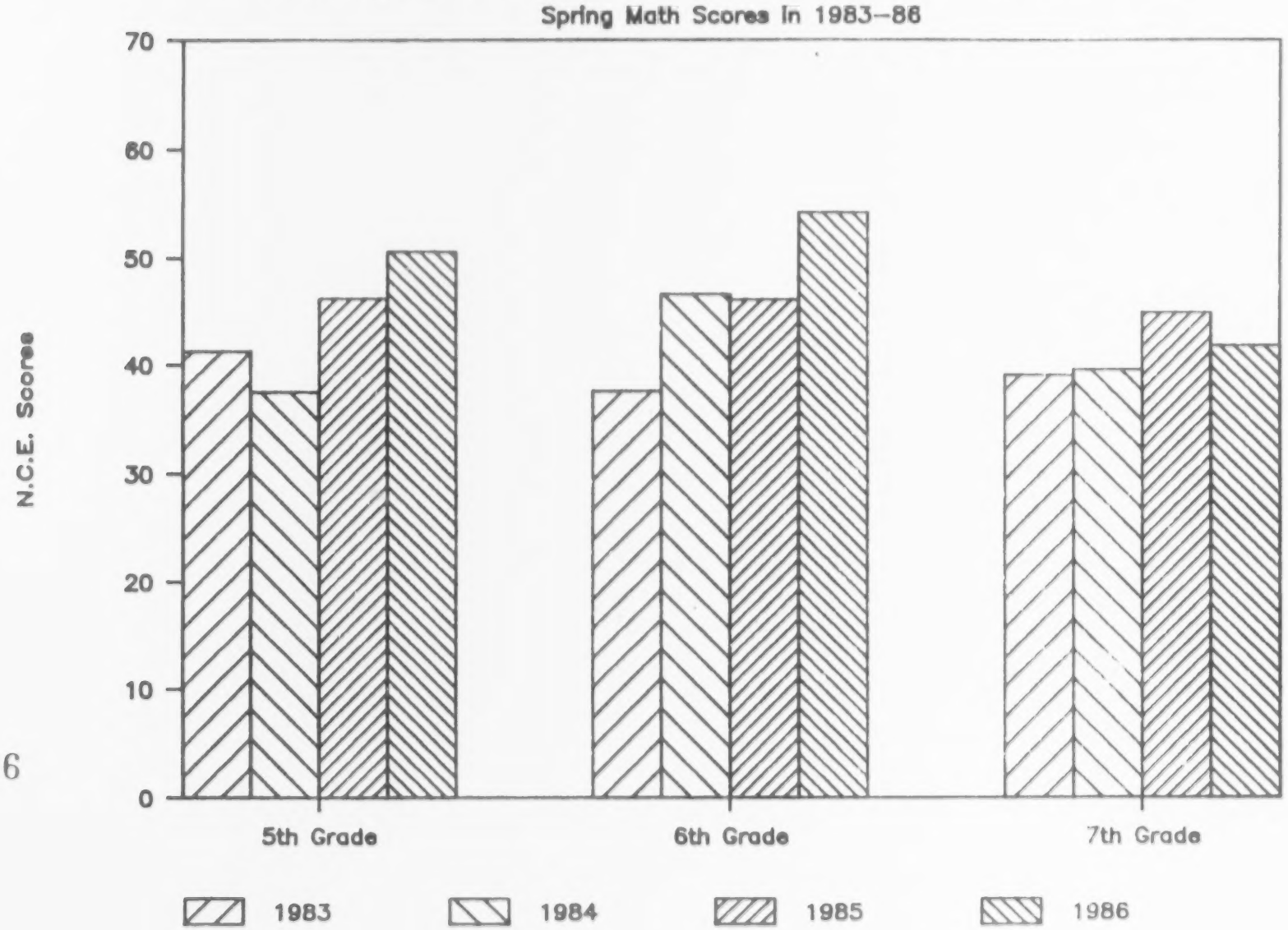
- Districts implementing the computerized testing system should conduct more staff development activities for administrators and supervisors on instructional planning and the use of test results.

- The ongoing curriculum revision process should address teachers' continuing reservations about the sequencing of objectives in the manuals.

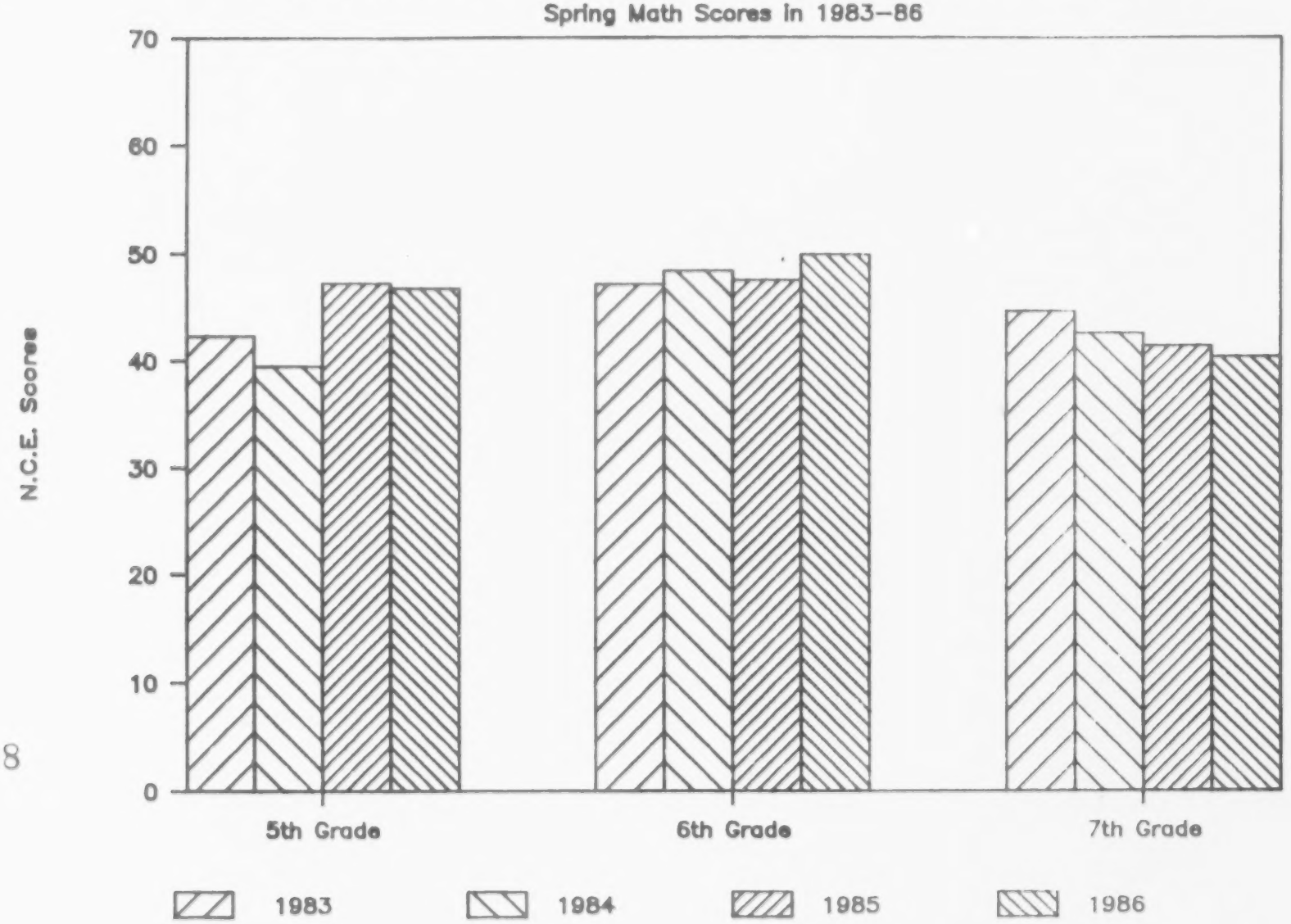
APPENDIX

Cohort Analyses for 1983-86

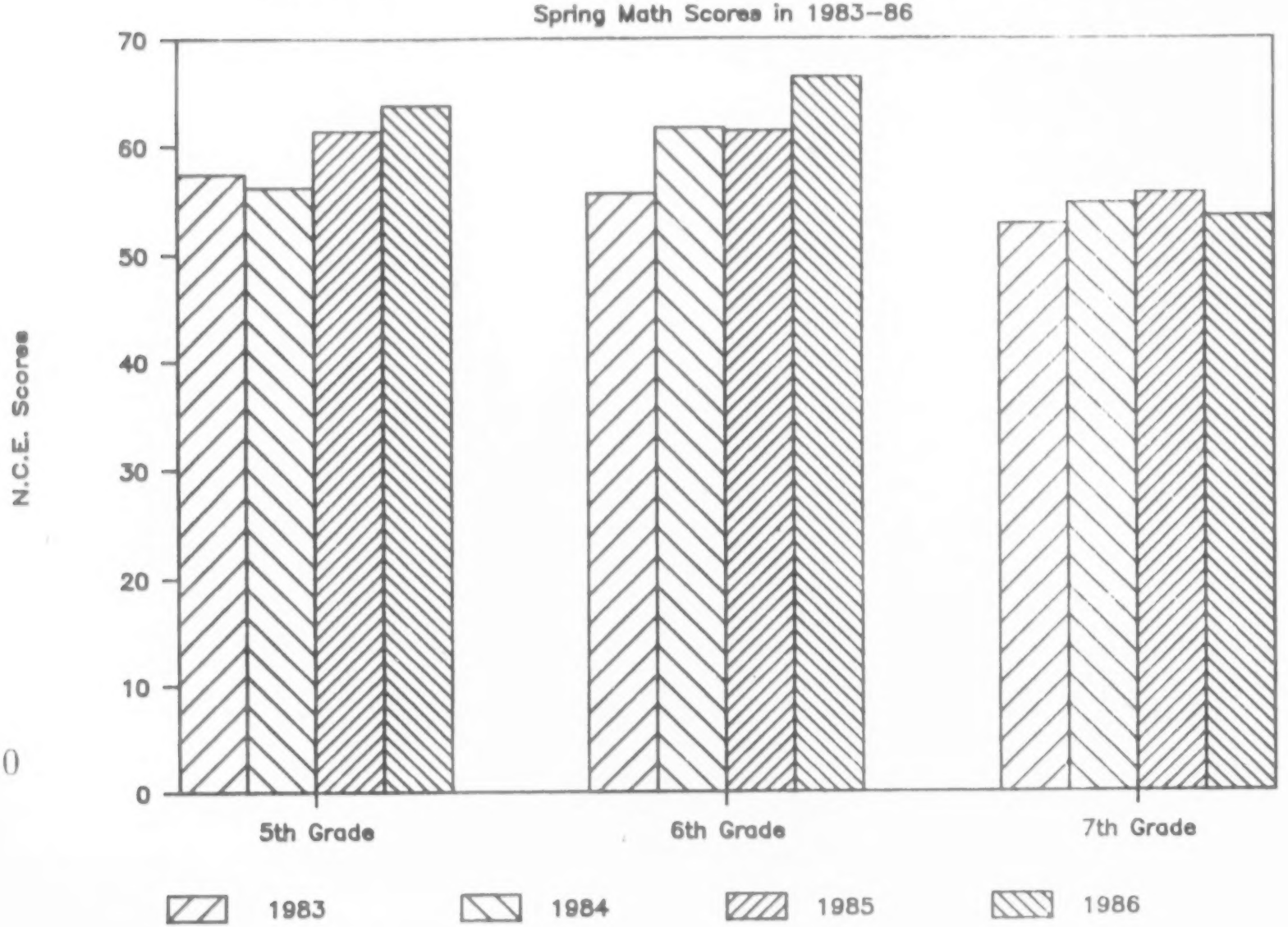
District 1 Cohort Analysis for 1983–86



District 12 Cohort Analysis for 1983–86



District 18 Cohort Analysis for 1983–86



District 23 Cohort Analysis for 1983–86

District 32 Cohort Analysis for 1983–86